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POROUS BODIES RESEARCH FOR DYNAMIC SEAL DEVELOPMENT

Abstract

The system for supplying fuel components of heat engines using turbopump units contains a large number of sealing devices of static and dynamic types, the efficiency of which is characterized by consumption efficiency. The use of vane dynamic seals in turbopump units is a forced measure aimed at ensuring the functioning of the engine as a whole, especially if the fuel components are self-igniting, and the engine circuit is with generator gas afterburning. One of the possible methods for increasing the flow efficiency of a turbopump unit may be the use of porous impellers instead of, for example, blade or slot impellers. Previous research has shown a porous impeller to provide a high speed shaft seal. In this study, the main task was to determine the effect of porosity on the flow characteristics of dynamic radial compaction. A comparison is made of a porous impeller with a traditional, classic, open-type impeller with grooves in the impeller. All experimental impellers had the same outer diameter and impeller width. The porous bodies were formed from wire meshes in such a way as to provide the required porosity value. The porous impeller rings were made of wire mesh of the same mesh size, but with a different number of layers to simulate different porosities. The rotor speeds were taken as calculated, at which the relative volumetric flow rate of the liquid that passed through the compared seals was determined. The practical value of the study is that, based on the result, it is possible to abandon the cascades of dynamic-type sealing devices following the porous compaction.